AMENDMENTS TO THE CLAIMS

Please **AMEND** claims 49, 51-54, 58, 67-69, 79-82, 85, and 86 as shown below.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-48 (Cancelled).

49. (Currently Amended) A method for producing a free-standing elastomeric nanocomposite film, said method comprising the steps of:

contacting a substrate with at least one nanoparticle species by immersing the substrate in a solution containing the at least one nanoparticle species to form a nanoparticle layer on the substrate;

contacting the nanoparticle-layered substrate with at least one ~~crosslinker reagent~~ polymer species by immersing the nanoparticle-layered substrate into a solution containing the at least one ~~crosslinker reagent~~ polymer species to form a ~~crosslinker~~ polymer layer on the nanoparticle-layered substrate to form an elastomeric film on the substrate; and

removing the elastomeric nanocomposite film from the substrate to form said free-standing elastomeric film.

50. (Previously Presented) The method of claim 49, further comprising the step of repeating said first contacting step and said second contacting step to form an elastomeric film having at least two bilayers.

51. (Currently Amended) The method of claim 49, further comprising the step of forming at least one ~~polymer~~ crosslinker layer by contacting at least one of the nanoparticle layer, the ~~crosslinker~~ polymer layer or the substrate with at least one ~~polymer~~ crosslinker species to form the at least one ~~polymer~~ crosslinker layer.

52. (Currently Amended) The method of claim ~~51~~ 49, wherein the polymer species is selected from the group consisting of one or more of poly(urethane), poly(etherurethane), poly(esterurethane), poly(urethane)-co-(siloxane), and poly(dimethyl-co-methylhydrido-co-3-cyanopropyl, methyl) siloxane.

53. (Currently Amended) The method of claim 49, further comprising the step of repeating said contacting steps to form a plurality of alternating nanoparticle and ~~crosslinker~~ polymer layers.

54. (Currently Amended) The method of claim 53, further comprising the step of forming at least one ~~polymer~~ crosslinker layer by contacting at least one of the nanoparticle layer, the ~~crosslinker~~ polymer layer or the substrate with at least one ~~polymer~~ crosslinker species to form the at least one ~~polymer~~ crosslinker layer.

55. (Previously Presented) The method of claim 54, wherein the polymer is selected from the group consisting of one or more of poly(urethane), poly(etherurethane), poly(esterurethane), poly(urethane)-co- (siloxane), and poly(dimethyl-co-methylhydrido-co-3-cyanopropyl, methyl) siloxane.

56. (Previously Presented) The method of claim 49, wherein said nanoparticle contacting step comprises immersing the substrate in the solution containing the at least one nanoparticle species for a time period in the range of about 1 minute to about 120 minutes.

57. (Previously Presented) The method of claim 56, wherein the time period is about 60 minutes.

58. (Currently Amended) The method of claim 49, wherein said ~~crosslinker~~ polymer contacting step comprises immersing the nanoparticle-layered substrate in a solution containing the at least one ~~crosslinker reagent~~ polymer species for a time period in the range of about 1 minute to about 30 minutes.

59. (Previously Presented) The method of claim 58, wherein the time period is about 10 minutes.

60. (Previously Presented) The method of claim 49, wherein the substrate in said substrate contacting step is selected from the group consisting of a glass slide, single crystal silicon, polycarbonate, kapton, polyethylene rigid polymer materials, flexible polymer materials, ceramics, metal surfaces, etched surfaces, functionalized surfaces, and non-functionalized surfaces.

61. (Previously Presented) The method of claim 49, further comprising the step of forming a functionalized substrate.

62. (Previously Presented) The method of claim 61, wherein the substrate is functionalized with a polymer.

63. (Previously Presented) The method of claim 62, wherein the polymer is an organosilane.

64. (Previously Presented) The method of claim 49, wherein the at least one nanoparticle species of said nanoparticle contacting step is selected from a group consisting of metallic nanoparticles, semiconducting nanoparticles, magnetic nanoparticles, ceramic nanoparticles, and dielectric nanoparticles, and a combination thereof.

65. (Previously Presented) The method of claim 49, wherein the nanoparticle species in said substrate contacting step is selected from the group consisting of a gold nanoparticle, a gold alloy nanoparticle, a gold core shell nanoparticle, a silver nanoparticle, a silver alloy nanoparticle, a silver core shell nanoparticle, a platinum nanoparticle, a platinum alloy nanoparticle, a platinum core shell nanoparticle, a palladium nanoparticle, a palladium alloy nanoparticle, a palladium core shell nanoparticle, a copper nanoparticle, a copper alloy nanoparticle, a copper core shell nanoparticle, and a combination thereof.

66. (Previously Presented) The method of claim 49, wherein the nanoparticle species has a diameter in the range of about 1 nm to about 1000 nm.

67. (Currently Amended) The method of claim ~~49~~ <u>51,</u> wherein the at least one crosslinker ~~reagent~~ <u>species of the crosslinker layer</u> ~~of said crosslinker~~ has at least two functional groups selected from the group consisting of hydroxyl groups, amino groups, carboxyl groups, carboxylic acid anhydride groups, mercapto groups, hydrosilicon groups, and a combination thereof.

68. (Currently Amended) The method of claim 67, wherein the crosslinker ~~reagent~~ <u>layer comprises</u> mercaptoethanol.

69. (Currently Amended) A method for producing a nanocomposite film, said method comprising the steps of:

~~contacting a substrate with at least one species of a nanoparticle and at least one crosslinker reagent to produce a nanocomposite film having at least two alternating layers including a nanoparticle layer and a crosslinker layer~~;

<u>contacting a substrate with at least one nanoparticle species by immersing the substrate in a solution containing the at least one nanoparticle species to form a nanoparticle layer on the substrate;</u>

<u>contacting the nanoparticle-layered substrate with at least one polymer species by immersing the nanoparticle-layered substrate into a solution containing the at least one polymer species to form a polymer layer on the nanoparticle-layered substrate to form an elastomeric film on the substrate;</u>

contacting the surface of the nanocomposite film with a resin; and

treating the resin on the nanocomposite film to form an abrasion resistant matrix on the nanocomposite film.

70. (Previously Presented) The method of claim 69, further comprising the step of removing the resin-coated nanocomposite film from the substrate to produce a free-standing resin-coated nanocomposite film.

71. (Previously Presented) The method of claim 69, wherein the nanocomposite film is functionalized by contacting a surface of the nanocomposite film with a crosslinker.

72. (Previously Presented) The method of claim 69, wherein the resin in said resin contacting step is an abrasion resistant resin selected from the group consisting of thermosetting resins, photosetting resins, phenolformaldehyde, phenol resins, epoxy resins, polysiloxane resins, polyurethane, and poly(etherurethane) resins.

73. (Previously Presented) The method of claim 69, wherein said resin contacting step comprises applying the resin by a method selected from the group consisting of spin coating, spraying, web-based processes, ink jet printing, and a combination thereof.

74. (Previously Presented) The method of claim 69, wherein said treating step comprises heating the resin on the nanocomposite film.

75. (Previously Presented) The method of claim 69, wherein said treating step comprises irradiating the resin with at least one of infrared light, UV light or visible light.

76. (Previously Presented) The method of claim 69, wherein said treating step comprises drying the resin.

77. (Previously Presented) The method of claim 69, wherein the resin in said resin contacting step forms a transparent coating.

78. (Previously Presented) The method of claim 69, wherein the nanoparticles in the nanoparticles layer are covalently integrated with the resin to form an abrasion resistant coating.

79. (Currently Amended) The method of claim ~~69~~ 70, wherein said removing step comprises removing the resin-coated nanocomposite film from the substrate by a method selected from the groups consisting of chemical dissolution of the substrate, mechanical removal, subambient removal, heating, irradiating with UV light, irradiating with infrared light, irradiating with visible light, and a combination thereof.

80. (Currently Amended) The method of claim 69, further comprising the step of forming at least one ~~polymer~~ crosslinker layer by contacting at least one of the substrate, the nanoparticle layer or the ~~crosslinker~~ polymer layer with at least one ~~polymer~~ crosslinker species to form a ~~polymer~~ crosslinker layer.

81. (Currently Amended) The method of claim ~~81~~ 69, ~~wherein the polymer is an organosilane~~ further comprising the step of functionalizing the substrate with a polymer.

82. (Currently Amended) The method of claim ~~82~~ 69, wherein the polymer species is selected from the group consisting of one or more of poly(urethane), poly(etherurethane), poly(esterurethane), poly(urethane)-co- (siloxane), and poly(dimethyl-co-methylhydrido-co-3-cyanopropyl, methyl) siloxane.

83. (Previously Presented) The method of claim 69, wherein the nanoparticle in said substrate contacting step is selected from the group consisting of metallic nanoparticles, semiconducting nanoparticles, magnetic nanoparticles, ceramic nanoparticles, and dielectric nanoparticles, and a combination thereof.

84. (Previously Presented) The method of claim 69, wherein the substrate in said substrate contacting step is selected from the group consisting of a glass slide, single crystal silicon, polycarbonate, kapton, polyethylene rigid polymer materials, flexible polymer materials, ceramics, metal surfaces, etched surfaces, functionalized surfaces, and non-functionalized surfaces.

85. (Currently Amended) The method of claim ~~69~~ 80, wherein the at least one crosslinker layer ~~reagent in said substrate contacting step~~ has at least two functional groups selected from the group consisting of hydroxyl groups, amino groups, carboxyl groups, carboxylic acid anhydride groups, mercapto groups, hydrosilicon groups and a combination thereof.

86. (Currently Amended) The method of claim ~~69~~ 80, wherein the crosslinker ~~reagent is~~ layer comprises mercaptoethanol.

87. (Previously Presented) The method of claim 69, wherein the nanoparticle species in said substrate contacting step is selected from the group consisting of a gold nanoparticle, a gold alloy nanoparticle, a gold core shell nanoparticle, a silver nanoparticle, a silver alloy nanoparticle, a silver core shell nanoparticle, a platinum nanoparticle, a platinum alloy nanoparticle, a platinum core shell nanoparticle, a palladium nanoparticle, a palladium alloy nanoparticle, a palladium core shell nanoparticle, a copper nanoparticle, a copper alloy nanoparticle, a copper core shell nanoparticle, and a combination thereof.

88. (Previously Presented) The method of claim 69, wherein the nanoparticle species has a diameter in the range of about 1 nm to about 1000 nm.